

CR-141002

## Progress Report No. 17

Title: A Study of the Early Detection of Insect Infestations and Density/Distribution of Host Plants.

Citrus Insects Research  
USDA, ARS  
509 West Fourth St., Weslaco, Texas 78596

Period: June 1-30, 1974

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- (A) During the month of June, 5.2 hours of aerial photographic flights were completed. The data obtained was compared to the Skylab data received from NASA. From the data acquired by our aerial photography we were able to confirm many of the previous observations which were made since the beginning of the remote sensing work at this laboratory. Citrus varieties of grapefruit, orange and tangerine were readily separated. Tree spacing as well as canopy coverage of an area could easily be determined. Certain insect infestations could also be detected. At this time of the year much of the cultivated land in this area contains cotton, grain, sorghum, and sugarcane. With our aerial photography we are able to identify each of these crops as well as the perennial crops. Many of the abnormalities that occur within these crops can also be detected. At the time the S-190B normal color and color IR photographs were taken of our area most of the cultivated land was without vegetation. The only vegetation growing at that time was winter vegetables, sugarcane, irrigated pastures and cover crops as well as citrus and unimproved pastures. From our examinations of the S-190B data that we have received, complete identification of crops being grown at that time must be obtained through the comparative use of both the normal color and color IR film. With color IR film citrus appears as a very deep red color, separating it from brush and sugarcane which contains no visible red color. The sugarcane had been subjected to freezing temperatures shortly

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before it was photographed leaving it void of any infrared reflecting chlorophyl. The brush at this time of year due to reduced chlorophyl content does not normally show up well on color IR film. With the normal color S-190B data, sugarcane which had not suffered a freeze when this film had been taken could easily be separated from brush and citrus, but citrus in some instances could not readily be separated from brush except where the geometric shape of the field was a determining factor.

- B. The results of our interpretation of products on photographic film is determined by resolution, color and density that is obtained by the film. We believe it would greatly enhance the possibility of attaining our objectives if we could view the original S-190B data, since the S-190B data we received is 3rd generation film which loses definition with each copy.
- C. Evaluation of the S-190B data will continue. Regularly scheduled aerial photographic flights will be made as the weather permits.
- D. Significant results that have been obtained are identification of citrus, sugarcane, winter vegetables, irrigated pastures and unimproved pastures which contain brush. Land without vegetation, lakes, roads and waterways can also be determined. Different densities of vegetation covering some cultivated areas are apparent. The practical applications of these results are many. The abundance of host plants of pests can be determined. Avenues of entry of pests can be plotted, facilitating control or preventing entry of pest species. The boundaries of areas to be quarantined can be accurately established after viewing the S-190B data. Better cultural methods can be employed such as planning where to plant certain crops that indirectly are detrimental to those already growing. This would relate to such factors as pesticide drift or alternate hosts of major pests.
- E. We will continue to analyze Skylab data. Ground truth and aerial photography data will be related to S-190B data.
- F. Travel to NASA Skylab meeting by W. G. Hart, Sammy Ingle and Rene Davis.